

Exam 3

Name: _____

Each problem is worth 10 points. Show all your work.

1. Give a formula for the reflection of the graph of $f(x) = 2^x$ across the line $y = x$.

2. Determine the interest rate of a bank account with continuously compounded interest and a doubling time of 32 years.

3. (a) Expand completely: $\log_2 \left(\frac{3x^3}{4(y+z)^4} \right)$

(b) Express as a single logarithm: $2 \log_2 x + 4 \log_4 y - 8 \log_8 z$

4. Solve for x :

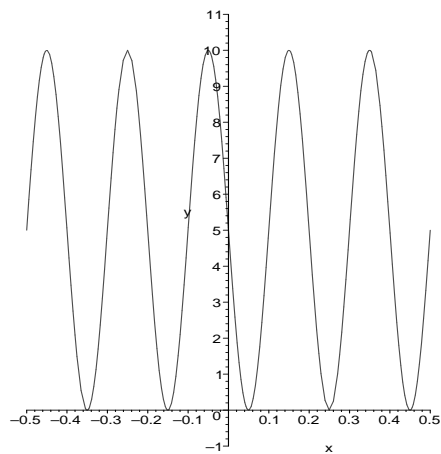
$$\log_3 (x^4 - 1) = \log_3 (3x^2 + 3)$$

5. Find the reference number, terminal point, and the value of all six trigonometric functions for $\theta = \frac{-55\pi}{44}$.

6. Express $\sec t$ in terms of $\cot t$, assuming the terminal point of t lies in the third quadrant.

7. Graph $2 \cot\left(6x - \frac{\pi}{12}\right)$ by hand. Include your calculations to find the period and phase shift. Show at least two complete periods, and label the x -values where the function has an asymptote or an integer y -value.

8. Give an equation for the function pictured below:



9. Find the speed of the outer rim of a 12-inch LP rotating at 33 rpm.

10. Suppose the angle of elevation to the top of a redwood visible from the edge of a cliff is found to be 60° , and the angle of elevation 103 feet back from the edge is found to be 30° . Determine the height of the tree, assuming the cliff is 198 feet high. (Hint: Begin by labeling all the angles in your diagram, and exploit any symmetry).